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NOTICE.

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UNITED STATES.

PLAGUE EPIDEMIC IN THE VILLAGE OF KOLOBOVKA, RUSSIA.

[Translated by P. A. Surg. H. D. Geddings from the annals of the Pasteur Institute, March, 1900, by Prof. V. Tchistowitch.]

The village of Kolobovka, where an epidemic of plague broke out during the second half of the summer of 1899, is situated in the department of Astrakan, 8 versts from the city of Tsarev. It is situated on the high banks of the little river Ahtouba, one of the affluents of the Volga, and is surrounded by "steppes." There are in the village 3,500 inhabitants, all Russians, who are for the most part cultivators of grain and raisers of sheep. In summer the greater part of the population moves habitually on to the steppes, quite a distance from the village, for their field labors, and they are quartered in provisional barracks. This occurred last summer as usual, so that there only remained in the village 550 people, either too young or too old to work in the fields. The first case of plague showed itself July 16 (July 28), Marie Semakina, aged 35, a deaf mute, unmarried, and dwelling in one of the barracks on the steppes, fell sick. She had fever, vomiting, and cough with bloody expectoration. She was carried to the village where she died July 21 (August 2). To her burial her nearest relations came. Two of them became sick on July 22 (August 3), presented the same symptoms and died three days after. Finally, from this time to August 9 (August 21), there was quite a series of cases, above all among the persons in direct contact with the patients. There were in all 24 cases of plague, of

which 23 were fatal. The symptoms were in all almost identical, and the type of the disease hyperacute.

Ordinarily, death supervened on the second, third, or fourth day at latest. The disease was ushered in by a chill and the temperature rose to 40° C. and even higher. The patients complained of headache, pains in the chest, and general weakness. Quite frequently there was vomiting. Out of 24 patients, 17 presented a cough with abundant fluid and bloody expectoration. On percussion, however, it was not possible to establish the presence of dulness, but, on auscultation, rales, sometimes dry and sometimes moist, were found. The pulse was frequent, even 120 to 140 per minute, and the tongue white and furred. Several of the patients had petechiæ on the skin. Buboes, properly speaking, were absent; in some patients, however, the glands were painful and slightly swollen. As to nervous phenomena, there was extreme lassitude, and later an agitation similar to drunkenness and which terminated in coma. Often the patients preserved entire consciousness up to within two or three hours of death.

For the sake of example, I will cite 2 cases where will be found a detailed statement of pathological conditions and bacteriologic findings.

1. Catherine Semekina, 54 years of age, in nursing her husband experienced on August 3 (August 15) great lassitude; temperature 38.9° C. On the three following days the temperature was normal and she complained only of headache. On August 8 (August 20) she had chills and the temperature rose to 39.1°–40° C., pulse 104–112; she complained of pain in the left chest and left hypochondrium; general weakness and was semicomatose from time to time. August 9 (August 21) temperature was 40° C., pulse 120–140, tongue white, petechiæ on skin. On auscultation, roughened respiration and rales. The neck was painful in the sterno-cleido-mastoid region. Died August 10 (August 22).

On necropsy made the day of death by Professor Levine about 400 c. c. of bloody serum was found in the left pleural cavity, and several ecchymoses upon the pleura and pericardium.

The connective tissue of the mediastinum was œdematous and presented several hemorrhagic areas. The lower lobe of the left lung was hypertrophied and hard, the surface of a reddish gray, not granular, and showed several confluent areas, gelatino-hemorrhagic in character, which covered the lobe. The upper lobe of the left lung and the entire right lung were hyperæmic and œdematous. The bronchial glands were enlarged and softened. The cervical and axillary glands were hyperæmic and of a cherry-red color. The retroperitoneal glands had undergone the same changes and the surrounding connective tissue was œdematous and the site of multiple hemorrhages. The left inguinal and femoral glands were enlarged and of a reddish purple color. In the largest femoral gland section showed two necrotic areas of a grayish yellow color. The spleen was manifestly increased in bulk, the capsule

tense, and the parenchyma of a cherry-red color. The liver was large and soft, and upon its capsule were found hemorrhagic areas. The other organs presented no marked departures from the normal.

2. Barbe Ziovina, age 9, was taken sick in the evening of August 9 (August 21). Temperature 40.4° C., pulse 160, delirium during the night. On the morning of August 10 (August 22) temperature 39.4° C., pulse 100; evening, temperature 39.6° C., tongue white, vomiting and delirium. Morning August 11 (August 23) temperature 38.5° C., pulse 100, skin hard and dry, agonized expression of countenance; evening, temperature 40.3° C. The inguinal and cervical glands were swollen. Morning August 10 (August 24) temperature 38.5° C., pulse 94, respiration 44; fell into coma and died. At the necropsy made by Professor Levine there were found disseminated petechiæ upon the chest, shoulders, and thighs, varying in size from the head of a pin to a pea. Small hemorrhagic spots upon the layers of the pleura, the pericardium, peritoneum and upon the mucous layer of the stomach and intestines.

The axillary, femoral, inguinal, retroperitoneal and mesenteric glands were enlarged, soft, of a cherry red on the surface, and on section ridged with miliary hemorrhages and yellowish sloughing areas. The surrounding connective tissue was the seat of numerous hemorrhages. The spleen was increased in volume, the capsule tense, the parenchyma soft and of a brownish red color. Hemorrhages into the capsule and suspensory ligaments of the liver. Kidneys hypertrophied, their capsules presenting numerous hemorrhagic areas. The connective tissue surrounding the renal calices is completely penetrated by hemorrhagic infiltrations.

In addition to these, necropsies were made on 3 other cases:

3. Theodose Semekine, age 18, fell sick July 30 (August 10). Died August 2 (August 14). On necropsy made by Professor Aroustamof there was a decided hyperæmia of the lower lobes of the lungs, increase in the size of the spleen, disseminated miliary hemorrhages upon the pleura, endocardium, and mucous membrane of the stomach. There were no more important changes in other organs.

4. Marie Zlobina, 58 years old. She had had cough with abundant bloody expectoration, sibilant rales on auscultation, fever, etc. On necropsy made by Drs. Fedorof and Olchevsky there was found an induration of the upper lobe of the left lung, presenting on section a grayish mottled appearance. On pressure there flowed from the cut surface a purulent, reddish fluid. The spleen was not enlarged and was firm. The cardiac muscle was soft and of a yellow color.

5. Jean Ponamaref, age 80, died August 7 (August 19). Necropsy made by Dr. Schmidt. The only lesions found were hyperæmia of both lungs, but without areas of consolidation, a bloody fluid present in the right pleural cavity, and some ecchymotic spots upon this pleura. Bacteriological studies were made upon 3 of the 5 necropsies at Kolo-bovka: cultures had been made from the organs, from smears of the

juice of organs from the last 2 necropsies (Catherine Semekina and Barbe Zlobina). The first bacteriological studies were made on the spot at Kolobovka by Drs. Aroustamof and Schmidt, Professor Levine and M. Tartakovsky who all recognized that the disease was the plague. Subsequently Professor Wyssokowitch and I were summoned to Kolobovka and in the presence of Professor Levine we made control experiments upon the materials collected at Kolobovka. These control experiments were made at Astrakan in the laboratory of the administration of fisheries.

In the smears made with the juice of organs of the persons who had died at Kolobovka, there were constantly found numerous rods, in all respects similar to those of plague. They were particularly numerous in the preparations made with the juice from the lung and from the spleen of Semekina and from the spleen of Zlobina. In sections of these organs we also found a great quantity of these rods.

Further, we have examined 3 cultures prepared by Professor Levine; 1 made from the lung of Semekina, another from the spleen of Zlobina, and a third obtained from a mouse which had been inoculated with the spleen of Semekina. The first 2 cultures were identical with cultures derived from Bombay; short, immobile rods, rounded at their extremities, not colored by Gram, and developing in bouillon without rendering it turbid. Upon agar at the end of twenty-four hours at 37° C. there was produced a sticky, milk-white layer. In sugar-agar there was no fermentation. Inoculations killed mice at the end of three days and guinea pigs on the sixth day. There were formed around these inoculations a hemorrhagic infiltration, with swelling of the neighboring lymphatic glands. The spleen was increased in size. In guinea pigs there were seen at the necropsy, in the spleen and lungs, whitish nodules, surrounded by a red areola, formed by hyperæmic tissue. In smears made with the exudate from the seat of inoculation, with the juice of the spleen, the lungs, the lymph glands, and finally with the blood, there were found numerous plague bacilli, with the very characteristic bipolar staining. They were in very large number in the nodules of the lung and spleen, and less numerous in the blood. The cultures were not pathogenic for pigeons.

In the third culture prepared by Professor Levine with the organs of the mouse, which had been inoculated with the spleen of Semekina, there were found bacilli which much resembled those of plague and which were pathogenic for mice.

However, they were distinguished from typical plague bacilli by the more rapid and abundant development in nutritive media, and they produced gas bubbles in sugar-agar. This bacillus should be better studied; it is possible that it may either be a variety of plague bacillus or even a pseudo-plague bacillus.

All these investigations enabled us to recognize in our report, presented to the commission on September 18, of the campaign against the

epidemic, that the disease which had shown itself at Kolobovka was indeed an epidemic of plague.

Later all the cultures obtained at Kolobovka were again examined at Fort Alexander I, near Cronstadt. In these new studies Professors Vinogradof, Vinogradsky, Tchistovitch, Levine, Raptchevsky, Tartakovsky, and Drs. Zabolotny, Schmidt, and Dsienkovsky took part. The following are the conclusions of these bacteriologists:

1. The cultures presented by Professor Levine, Drs. Tartakovsky, and Schmidt, and prepared by them from the organs of 3 patients (Ponomaref, Semekina, and Zlobina) who died at Kolobovka, can not be distinguished, the one from the other in any important particular.

2. The shape and appearance of the organism, as well as the peculiarities of its growth in various culture media, as bouillon, peptone-gelatine, peptone-agar, sugar-agar, and milk, correspond exactly to those of the organism of bubonic plague.

3. The pathogenic qualities of all the cultures of the organism examined correspond exactly to the same type. The bacillus injected in moderate doses subcutaneously, kills mice in forty to fifty-four hours; guinea pigs in seventy-two hours to five days. A monkey (*Macacus rhesus*) to which was given a subcutaneous injection in the arm, had in twenty-four hours, a temperature of 39.6°C. and an axillary bubo on the side of the injection. Necropsies of the animals which succumbed in consequence of the injections presented the characteristic picture of experimental plague, and bacteriological studies of the various organs of these animals gave similar results.

4. Microscopic examination of sections of organs of 2 persons dead at Kolobovka (Zlobina and Semekina) enables us to prove the presence in these organs of large numbers of bacilli identical with those which were studied and found in the cultures, and which are the same as are usually found in the bodies of persons dead of bubonic plague.

Thus it was established and proved that the disease which had made its appearance at Kolobovka was truly the plague, and further that it was of a malignant type. In the 2 cases (Catherine Semekina and Marie Zlobina) which were studied most in detail the plague had assumed the pneumonic form and in the third (Barbe Zlobina) there was demonstrated a general swelling of the glands. Bacteriological study of this last case demonstrated that it was a case of mixed infection by the plague bacillus, which was found in great numbers in the spleen, and by diplo-streptococcus. The fourth case (Theodose Semekina) was of the pneumonic type, but not completely evolved. Great numbers of the bacilli were found in the spleen and the blood.

The course of the disease was very rapid at Kolobovka. It killed promptly before the local manifestations could become established. And probably it is by reason of the great virulence of the bacilli that we can explain the peculiarity of the plague at Kolobovka; its exclusively pneumonic and septic type and the absence of the characteristic buboes.

How was the plague brought to Kolobovka? This question remains unanswered. It is possible that it may have come to Astrakan from Persia through Mussulman pilgrims, or, as is conjectured by Dr. Zabolotny, that it may have come from Mongolia. In the steppes which extend from the Volga to the Urals there are numerous nomadic Buddhist Kalmouks.

Before finishing I would like to say a few words concerning the measures which were taken to suppress the epidemic. These measures, executed under the supervision of the president of the commission for the suppression of the plague, Prince Oldenburg, consisted in a complete isolation of the infected locality. Kolobovka with the neighboring steppe was surrounded by a cordon composed at first of the inhabitants and afterwards of soldiers. This cordon extended for a distance of 195 versts. All the inhabitants of the locality were registered. The patients were transported to a special house which was converted into a hospital. Another house was prepared for the observation of suspects. The houses where there had been cases of plague were closed, sealed, and subsequently burned, and neighboring houses were disinfected. The village was divided into quarters and to each quarter there was appointed an "inquisitor" who twice a day made the rounds of the quarter, and made an inspection of the inhabitants, sending to hospital any new cases.

At two points of the cordon there were passages. At one of them was established a post of observation, furnished with a disinfecting chamber, baths, and small huts prepared for the lodgment of persons for a quarantine period of ten days, who might desire to leave the infected locality. The points of passage were connected with each other by telephone, and with the city of Tsarev. The dead were interred in a special cemetery and the graves were filled and covered with a thick layer of lime.

On August 23 preventive inoculations with Haffkine prophylactic were begun. Nearly 4,000 were inoculated and there only remained 40 noninoculated people. The last patient, who was stricken August 1, recovered; since then there have been no more cases of plague in Kolobovka.

After having burned the infected houses and disinfected the neighboring ones, the cordon was raised on September 12, but the post of observation remained until the following spring.

[Reports to the Surgeon-General United States Marine Hospital Service.]

REPORTS FROM THE MEXICAN BORDER.

El Paso, May 5, 1900.—I have the honor to report the following summary of work at this station for the week ended May 5, 1900: Inspection of Mexican Central Railroad passenger trains, 212; inspection of Rio Grande and Pacific Railroad passenger trains, 35; inspection of immigrants, 43; disinfection of baggage, clothing, blankets, etc, 16; disinfec-